

## CHAPTER 4

DISPOSAL AND HANDLING  
CONSTRAINTS IMPOSED BY WASTE COMPOSITION**4-1. Impact of the waste stream on selection of disposal type.**

a. The physical state of the hazardous waste and the chemical characteristics of the waste are the two most important factors to be evaluated in selecting the appropriate disposal option. With respect to physical state, disposal options at Army installations for bulk liquid hazardous wastes and sludges with leachable liquids are limited to surface impoundments and, in certain special cases, injection wells. The latter, rarely used because of the hydrogeologic constraints inherent in their siting, are suitable for large quantities of aqueous wastes, including acids, alkalis, inorganic brines and oily waste waters (see chapter 5).

b. Most solid hazardous wastes are disposed of in landfills; however, small quantities of semi-solid and solid hazardous wastes such as mine tailings are stored or treated in waste piles. It is important to note that RCRA regulations stipulate that waste piles may not be used as an ultimate disposal method; if the owner/operator of a waste pile wants to dispose of the accumulated wastes, he must obtain a landfill permit and manage the pile as a landfill.

c. The second major factor concerning the waste stream that impacts selection of disposal type is the chemical/physical characteristics of the waste. Restrictions based on these characteristics are that ignitable or reactive wastes may not be placed in a facility unless the waste is rendered non-ignitable or non-reactive and incompatible wastes may not be placed in the same facility.

**4-2. Design and handling constraints imposed by waste composition**

a. The physical and chemical characteristics of a particular waste impose the primary constraints in managing these wastes. Characteristics which must be considered include ignitability, reactivity, corrosivity, compatibility and physical state (liquid or a solid). Other composition factors which must be evaluated are the chemical makeup of the waste, its mobility in soil (and water), metal concentrations and, indirectly, the containerization method.

b. Ignitability and reactivity are defined in 40 CFR 261. These definitions, in combination with the federal requirements given in the Hazardous Waste Permit Program outline the requirements and waste composition constraints for individual hazardous waste facilities; surface impoundments, waste piles, land treat

ment and landfills. In general, ignitable or reactive waste must not be placed in a hazardous waste facility unless "the waste is treated, rendered, or mixed before or immediately after placement so that the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste" (40 CFR 264).

c. Incompatible wastes may not be treated or disposed of unless the owner or operator takes precautions to prevent reactions which: (1) Generate extreme heat or pressure, fire or explosions, or violent reactions.

(2) Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health or the environment.

(3) Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions.

(4) Damage the structural integrity of the device or facility.

(5) Threaten human health or the environment through similar means.

d. The owner or operator of a waste pile must also physically separate any pile containing wastes potentially incompatible with materials stored nearby in containers, open tanks, etc., by means of a dike, wall, berm, or similar means.

e. Chemical composition may also impose some handling/disposal constraints. For example, if the waste material is defined as toxic by the EPA Extraction Procedure Toxicity Characteristic (40 CFR 261.24) or the Acute Hazardous Waste Designation [40 CFR 261.11(2)], special handling or disposal methods may be required. Another impact the design engineer should consider is the potential effect of toxic organic emissions from the treatment/disposal of selected halogenated organic compounds; several states are now considering the elimination of disposal of these materials.

**4-3. Waste analysis plan**

a. 40 CFR 264, subpart B, requires that owners or operators of all hazardous waste management facilities obtain a chemical and physical analysis of a representative sample of all waste to be managed by their facilities. At a minimum, the analysis must contain all the information necessary to treat, store, or dispose of the wastes properly in accordance with part 264.

b. The analysis may include data from part 261

(Identification and Listing of Hazardous Waste), and existing published or documented data on the hazardous waste or on hazardous waste generated from similar processes. At a minimum the plan must specify: (1) The waste sampling method used to obtain a representative sample.

(2) The parameters selected for laboratory analysis for each waste, including those required in subparts J through Q.

(3) The rationale for selection of these parameters for laboratory analysis.

(4) The methods or procedures applied during laboratory analysis.

(5) The frequency of sampling and analysis to be conducted on subsequent shipments of the same waste to ensure that the analysis is accurate and up to date.

(6) For off-site facilities, the sampling methods and procedures used to identify each movement of hazardous waste to ensure that the wastes are the same as those indicated on the accompanying manifest or shipping paper.

c. 40 CFR 264.13(a)(3) requires that the plan be up

dated and changed as needed to remain accurate.

d. The waste analysis plan must include analytical methods to determine ignitability (section 261.21), reactivity (section 261.23) and incompatibility (appendix V, part 264) with respect to the disposal/treatment method. Section 264.17 gives the general requirements for handling these types of wastes and outlines waste constituent constraints which should be considered in developing the waste analysis plan.

e. Each facility also has unique identification (analysis) requirements which would be contained in the waste analysis plan. For example, a "trial test" is required whenever a "substantially different" waste or process is introduced to a surface impoundment; land treatment and landfill operations require the owner/operator to obtain information on the composition, characteristics, and mobility of the wastes to determine the extent of closure and post-closure care which will be necessary to protect human health and the environment.

f. Analytical methods, to ensure compliance with the regulatory requirements, are contained in EPA SW-846.